Clean Cities, MOBILE6 and AFV Emission Reduction Credits: Methodology and Future Prospects

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Alternative Fuel Vehicles in the U.S.

- ***Alternative* Fuel Vehicles (2002 estimates)**
  - **110,000 CNG vehicles**
  - **10,400 Electric vehicles**
  - **269,000 Propane vehicles**
- ***Alternative* Fuel Refueling Stations**
  - **1,280 Natural gas stations**
  - **592 Electric rechargers**
  - **3,353 Propane stations**
  - **240 E85 stations**
- **Approximately 43 light-duty models available in 2002**
- **100 medium/heavy-duty models available in 2002**

U.S. Barriers to Alternative Fuels

- Distraction and hype over new technologies
- Consumers & fleets need more information
- Vehicle mismatch makes sales difficult
- EPACT is 10 years old and aging quickly
- Lack of refueling stations
- Oil is a tough competitor

Clean Cities Program

- **A voluntary, locally based government/ industry partnership**

– **Currently 80 Active Coalitions**
– **Over 4,800 Stakeholders**
– **181 million gallons of petroleum displaced per year**
– **32,000 metric tons of emissions reduced per year**

Local Clean Cities Objectives

- Identify and Educate Fleets About Alternative Fuels
- Build Necessary Refueling Sites
- Train Drivers, Mechanics and Others
- Educate the Public
- Find Adequate Resources for AFV Projects
- Encourage Governments to Pass Legislation Favorable to AFVs

Niche Markets are Large Fuel Users

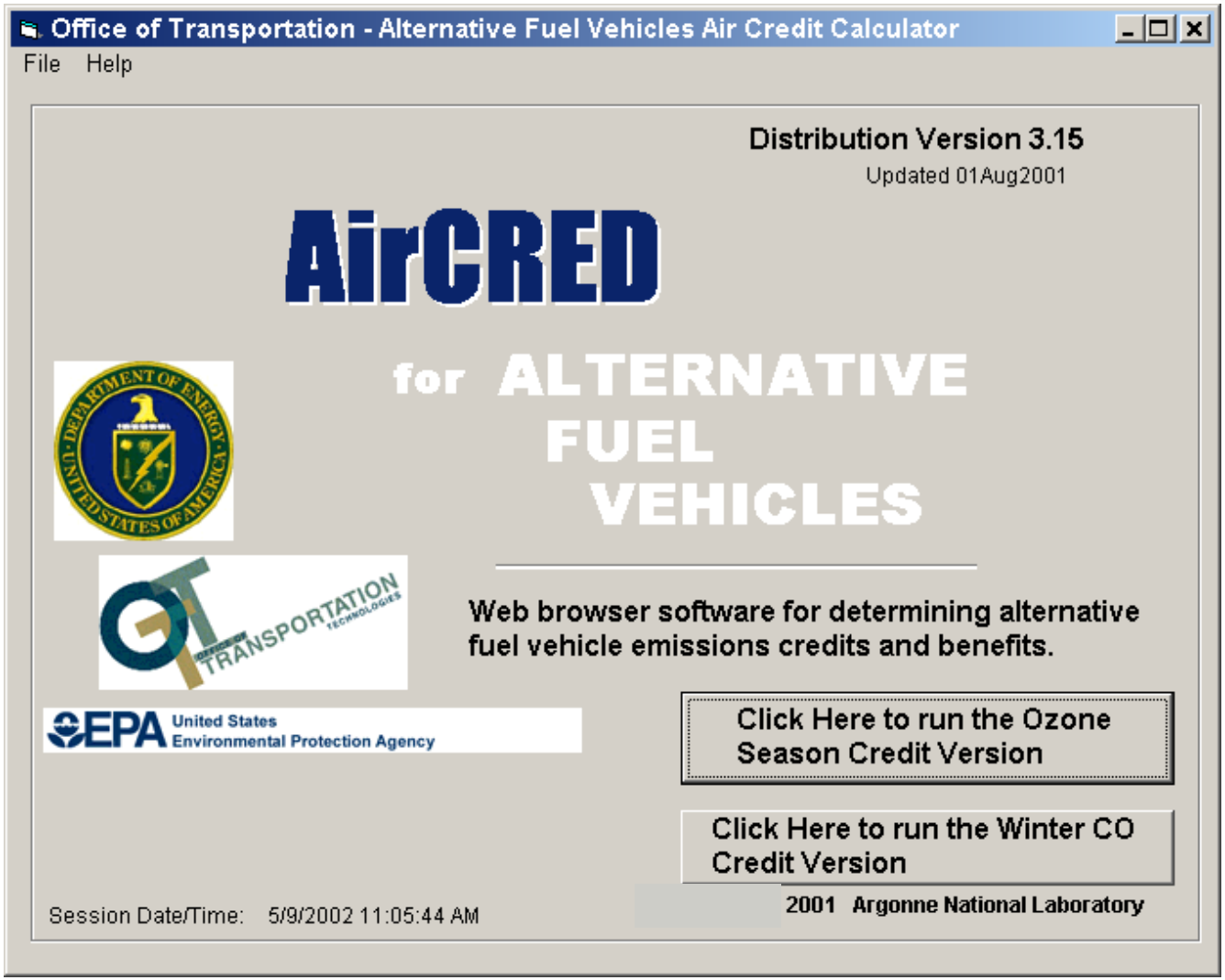
Vehicle	Total Population of Vehicles in U.S.	Fuel Use per Year for Total Population (million gal)
Transit Buses	50,000	500
School Buses	500,000	824
Average HDVs	3,927,700	17,260
UPS Medium Trucks	57,000	57
Private Fleet Light Trucks	2,330,000	1,255
FFVs using E85	750,000	404
Total Vehicles	7,614,700	20,300

Criteria Pollutant Emission Reduction Credits for AFVs

- Many air quality non-attainment and maintenance areas still need to find new emission reductions for implementation plans under existing standards
- EPA's VMEP program has been very helpful in this quest for new credits, but time is fast approaching that VMEP-based reductions need to be locked in
- AFVs have provided the most consistent, durable, reliable, and defensible reductions in this program

AirCred: One Approved Method for Reduction Credit Estimation

- Certified by EPA/OTAQ in 2000 for application to VMEP and SIP emission reduction calculations attributable to on-road AFVs
- Approved by DOT for estimating program effectiveness in CMAQ grant applications
- Over 1,000 users and other interested parties have downloaded the tool from its web site since it became available



http://www.aircred.anl.gov/

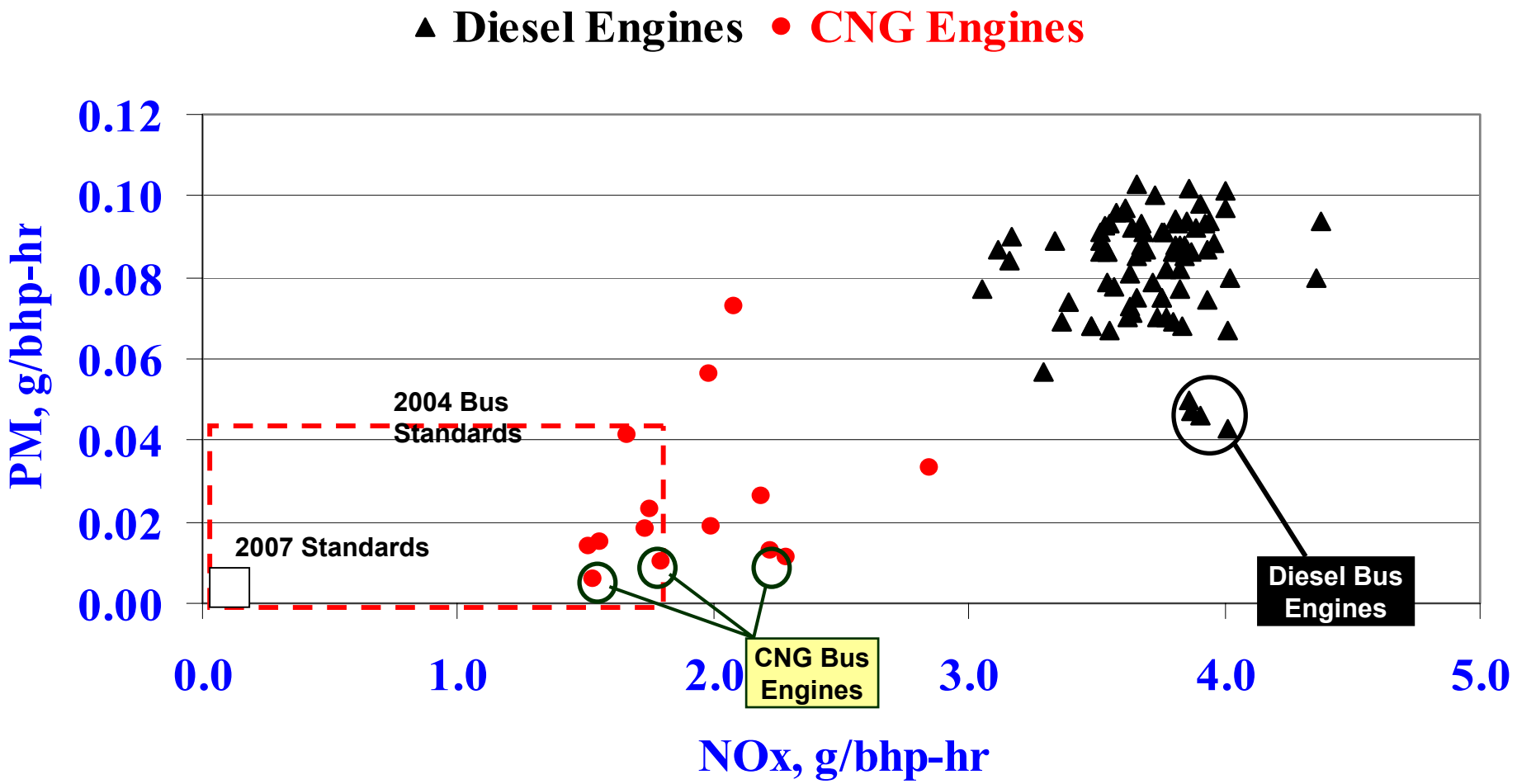
MOBILE6 Brings Major Changes to the Emissions Estimation Process

- Baseline credits for AFVs must now reflect net savings relative to conventional counterparts certified under NLEV
- Certification data now based on the Supplemental Federal Test Procedure (different average operating speed from prior process)
- Natural gas vehicles are explicitly included in the model, but emission test data applied are based largely on pre-1999 technology

EPA's Approach to Gaseous-Fuels Differs Between Light- and Heavy-Duty AFVs

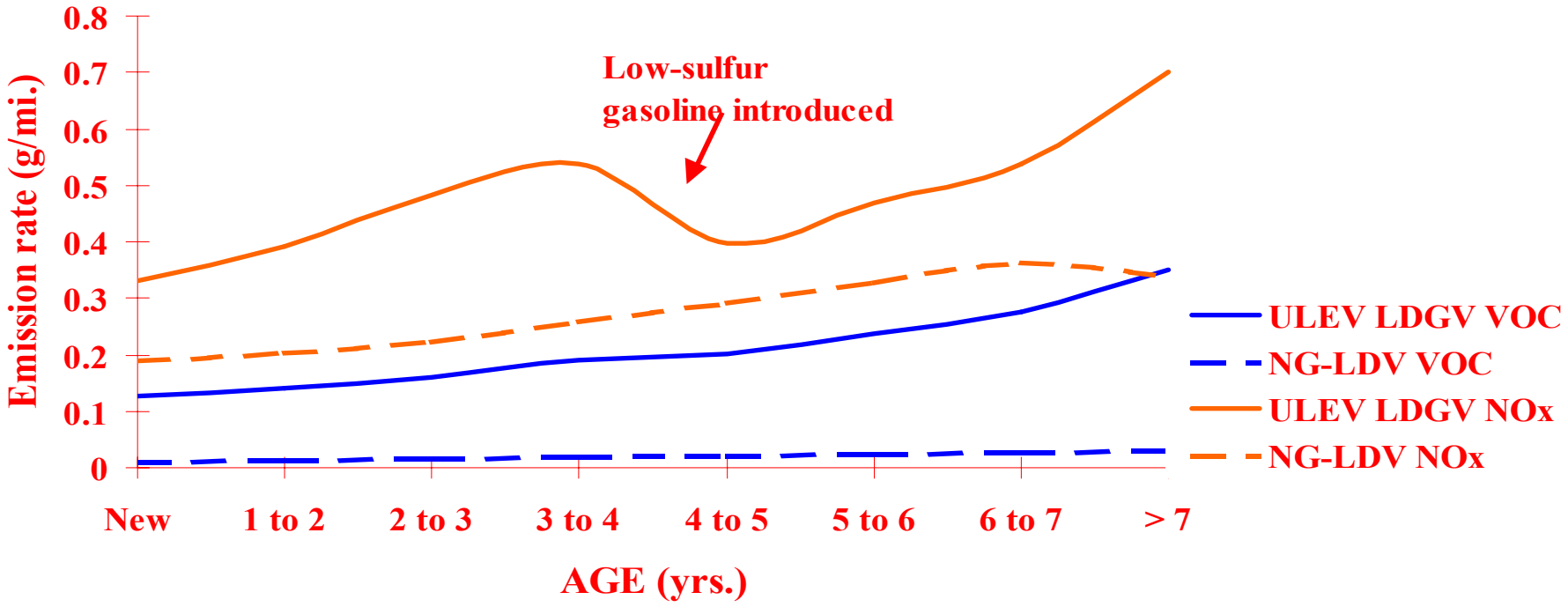
- ☺ Because the majority of CNG automobiles and light trucks are SULEV-certified in California, MOBILE6 assigns them better-than-ULEV (NLEV-based) performance, with lower deterioration
- ☹ Despite consistently superior engine NOx certification results relative to CI counterparts, MOBILE6 shows next to no net benefit for heavy-duty natural gas-fueled HDVs compared to new diesel units

2001 HDE Emission Certification Data



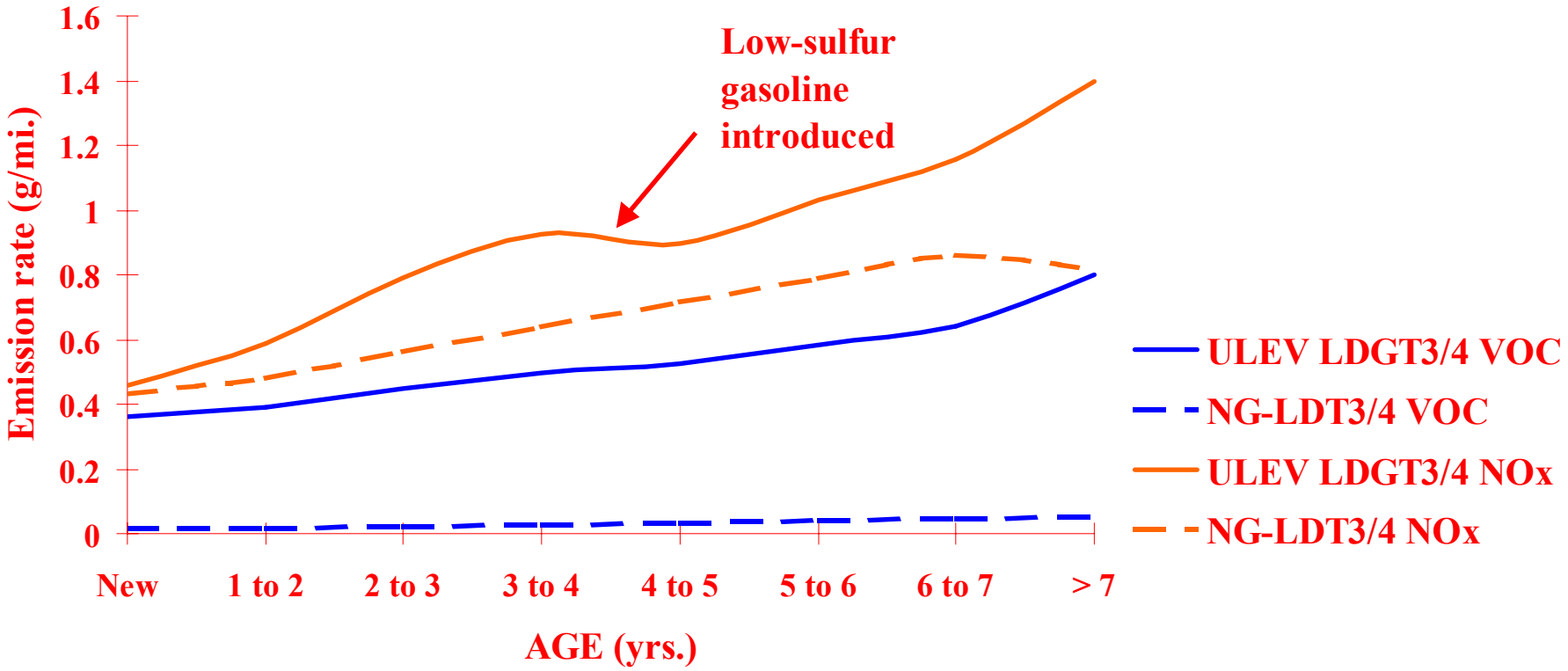
Natural Gas LD Units Look Good vs. Gasoline-fueled ULEV Automobiles...

MOBILE6 Age-Specific NMHC and NOX Average Summer Emission Rates for New (2002) NG-Fueled and Tier 1 ULEV-Certified Conventional Gasoline LDVs

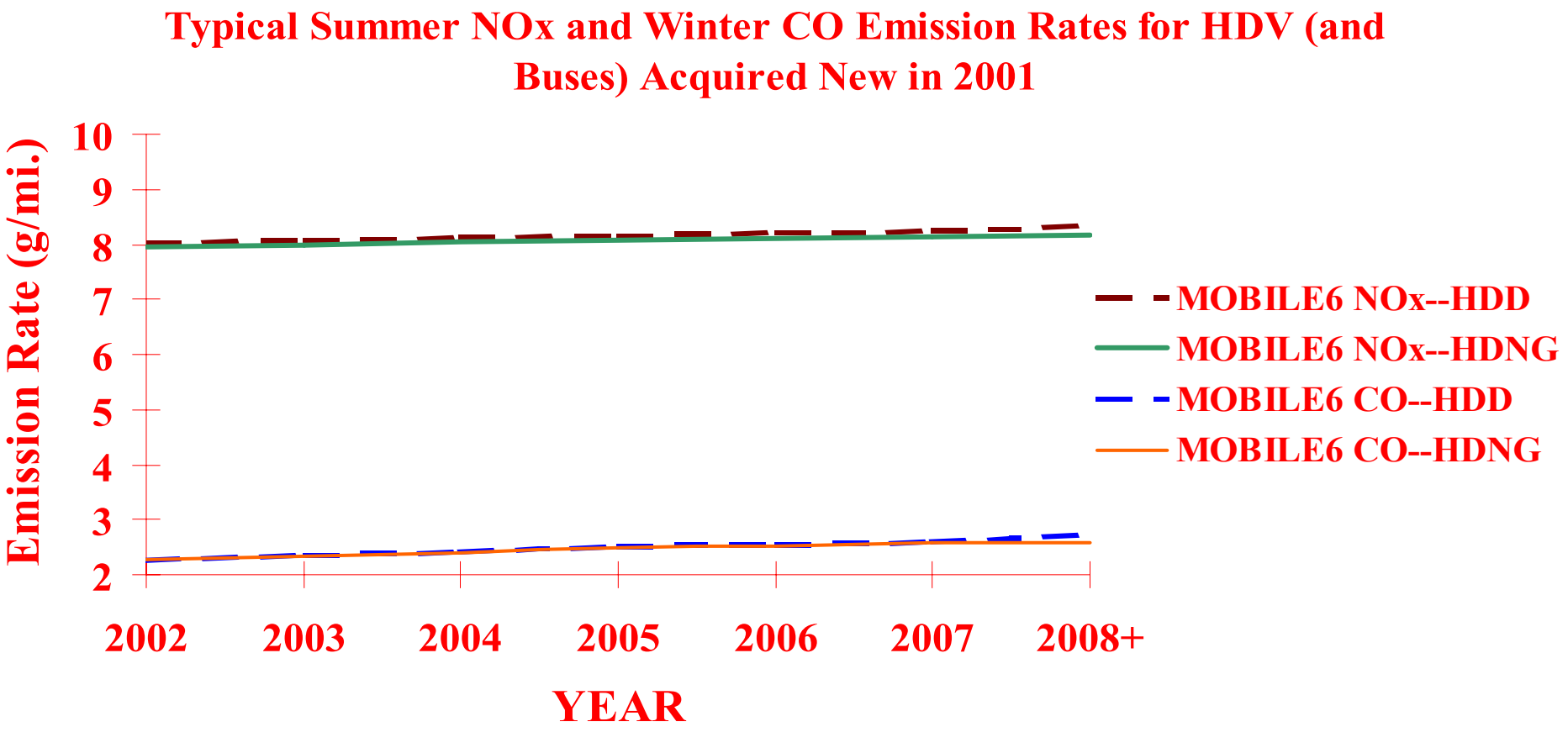


...and Heavier Light-Duty Trucks (all CNG Light Trucks are Certified in Classes 3/4)

MOBILE6 Age-Specific NMHC and NOX Average Summer Emission Rates for New (2002) NG-Fueled and Tier 1 ULEV-Certified LDT3/4s (Heavy LDTs)

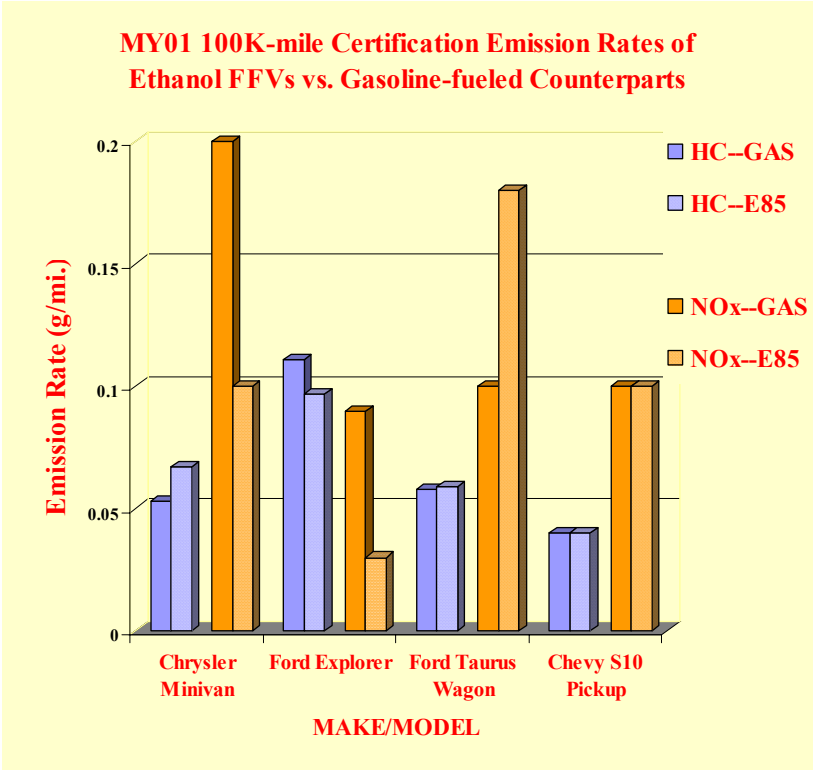


…But Near Zero Benefit Acknowledged for NG in Heavy-Duty Application



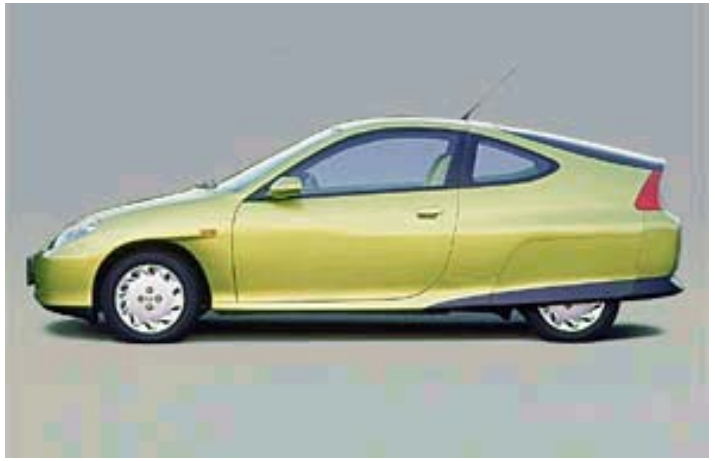
When May We Expect E-Blends & Biodiesel to Earn Consistent Credits?

- Biodiesel clearly superior on PM and toxics
- PM SIP calls will be important for these fuels, as will proposed California CO2 limits
- E-blends (including E-diesel) superior on PM and, in some cases NOx (improvement not yet sufficiently uniform to include a fleet average)



How About Electric Hybrids?

- Everything currently available is meeting ULEV or SULEV certification limits
- Charge-sustaining hybrids like the Prius, Civic, and Insight do not qualify as AFVs as long as petroleum serves as the primary propulsion fuel
- They do, however, qualify as EPA CFVs, and more varieties (likely with tax incentives) could be available next year



Rules on Conversions Remain Flexible and Could Encourage a Stronger Conversion Market

- No evaporative, SFTP, or cold CO certification testing required for gaseous fuels
- No fuel economy testing, reporting, or compliance requirements for any alternative fuels
- Converter may use OEM rather than EPA-assigned emission deterioration factors
- Data entry process simplified
- Only limited after-market confirmatory testing by EPA
- Certificate of Conformity fee much reduced
- No re-certification on gasoline required for dual fuel conversions

Should the Push Continue for Getting SIP and VMEP Credits for Off-road AFVs?

- ABSOLUTELY! EPA has made available a tool for estimating reduction credits for ground service equipment at airports at *http://www.epa.gov/otaq/transp/vmweb/vmairgnd.htm*
- Significant off-road mobile source clean fuel, emission retrofit, and AFV initiatives are underway for the Houston and Dallas - Fort Worth areas (not to mention California)
- Remains the single most promising area for reducing heretofore uncontrolled emissions

Summary & Conclusions

- MOBILE6 introduces complications into the AFV emission credit calculation process, but these are not insurmountable
- Continued dialogue with EPA will be necessary to resolve heavy-duty NGV discrepancies
- Without regular update, both light- and heavy-duty AFV emission factors in MOBILE6 may be suspect as 8-hour ozone and fine PM SIPs are developed
- Importance of particulate emission reduction credits for areas under $PM_{2.5}$ non-attainment designations should expand the menu of creditable "*American Fuel Vehicles*" and fuels

Clean Cities Links

- **Tools**
  - Clean Cities Vehicle Buyer's Guide – designed to help you understand and acquire AFVs www.ccities.doe.gov/vbg
- **Associations**
  - National Alternative Fuels Training Center http://naftp.nrcce.wvu.edu/
  - International Association of Natural Gas Vehicles www.iangv.org
  - Natural Gas Vehicle Coalition www.ngvc.org
  - National Propane Gas Association www.npga.org
  - National Ethanol Vehicle Coalition www.e85fuel.com
  - Electric Vehicle Association of the Americas www.evaa.org
  - National Biodiesel Board www.nbb.org
- **Upcoming Conference**
  - World NGV2002 Conference, October 8-10, Washington DC

And Don't Miss...

- **9th Annual Clean Cities Conference & Exposition Palm Springs, CA, 18-21 May, 2003**
  - **A perfect opportunity to learn more about *AFV*s and how to incorporate them successfully into your air quality and transportation plans**